Space Weather Forecast

Issued on Monday, 18 September 2023 at 13:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1-G2 minor/moderate storm intervals expected during Tuesday 19th September however, with a likely CME (coronal mass ejection) arrival bringing a slight chance of a G3/Strong storm. Chance of isolated R1 Minor Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours. There are currently six numbered sunspot regions and two un-numbered on the visible disc. The most active spot over the last few days is located in the northwest quadrant, but this region has continued to see weakening and fragmentation within its central portion, and is now given a slight reduction in flare risk. Four other spot groups are located in the western hemisphere, with two recently numbered bi-polar groups in the northwest and southwest showing the most increase in recent development. The largest spot group remains is a bi-polar group toward the east limb.
No new Earth-directed CMEs were observed in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds were at slightly elevated levels between 430-480km/s with some waning coronal hole influence likely ongoing, and perhaps evidence of a weak transient soon after midnight UTC. The total magnetic field strength of the solar wind was steady and weak initially, but increased slightly after midnight UTC reaching moderate levels. The north-south component showed a similar trend but remained within weakly varying north/south strength. Geomagnetic activity, as measured by BGS, was mostly Quiet to Unsettled (Kp 2-3) but reached Active levels (Kp 4) between 18/0000-0600UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Low activity expected, but there remains a chance of isolated Moderate Class flares throughout the period.

Solar Wind / Geomagnetic Activity: There are currently two CMEs that feature in the forecast. The first CME was likely associated with an M2.4 flare from AR3229 at 14/2126UTC. With a possible glancing arrival suggested during day 1 (18 Sep).

The second a large filament eruption and associated CME which occurred early on the UTC day of 16 Sep has been analysed and modelled in Enlil, which suggests a likely Earth directed component with an arrival time during Day 2 (19 Sep).

Quiet to Unsettled conditions at first on Day 1 (18 Sep), though there remains a chance of G1 minor storm intervals from a potential glancing CME during the second half of Day 1 (18 Sep). G1-G2/Minor-Moderate storm intervals expected during day 2 (19 Sep), with a Chance of a G3/strong storm due to the expected arrival of the large CME from the filament eruption on 16

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Sep, potentially combined with coronal hole influence. CME and coronal hole effects perhaps lingering into day 3 (20 Sep) but likely waning somewhat by day 4 (21 Sep).

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a daily slight chance of an enhancement should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	30	80	60	30
Strong	G3	No	5	30	10	5
Severe	G4	No	1	2	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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